Internship Training

at

Oxyent Medical

To Study the Knowledge, Attitude, Current Practices & Adoption towards Electronic Health Records amongst Physicians

Name: Dr. Aisha MahwishShamsi

Enrollment No: PG14/003

Under the guidance of

Dr. AnandhiRamachandran

[Associate Professor]

Post Graduate Diploma in Hospital and Health Management

International Institute of Health Management Research New Delhi

2014-16

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OXYENT MEDICAL PVT. LTD.
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The certificate is awarded to

Dr. Aisha Mahwish Shamsi

In recognition of having successfully completed her

Training in the department of

Business Analysis

And has successfully completed her Project on

To Study the Knowledge, Attitude, Current Practices & Adoption towards Electronic Health Records amongst Physicians

Date: 30th April 2016

Oxyent Medical

She comes across as a committed, sincere & diligent person who has a

strong drive & zeal for learning

We wish her all the best for future endeavors

Chief Technical officer
Harpreet Singh

For OXYENT MEDICAL PVT. LTD.

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that Aisha Mahwish Shamsi student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from International Institute of Health Management Research, New Delhi has undergone internship training at Oxyent Medical from 8th February 2016 to 30th April 2016.

The Candidate has successfully carried out the study designated to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

Dr. A.K. Agarwal

Dean Academics and Student Affairs

Affairs IIHMR, New Delhi

Anandhi Ramchandran

Associate Professor

IIHMR, New Delhi

Certificate of Approval

The following dissertation titled "**To Study the Knowledge, Attitude, Current Practices & Adoption towards Electronic Health Records amongst Physicians**" at **Oxyent Medical** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **Post Graduate Diploma in Health and Hospital Management** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr. Anarchi Ramachadran	
Dr. Nishikant Bele	
Dr. Oommen John	

Certificate from Dissertation Advisory Committee

This is to certify that **Dr. Aisha Mahwish Shamsi**, a graduate student of the Post- Graduate Diploma in Health and Hospital Management has worked under our guidance and supervision. She is submitting this dissertation titled **"To Study the Knowledge, Attitude, Current Practices & Adoption towards Electronic Health Records amongst Physicians"** at **Oxyent Medical** in partial fulfillment of the requirements for the award of the Post- Graduate Diploma in Health and Hospital Management.

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

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Associate Professor

International Institute of Hospital &
Health Management, New Delhi

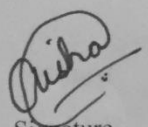
Mr. Harpreet Singh
Chief Technical Officer
Oxyent Medical, New Delhi

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH,

NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation "**To Study the Knowledge, Attitude, Current Practices & Adoption towards Electronic Health Records amongst Physicians**" and submitted by Dr Aisha Mahwish Shamsi Enrollment No. PG14/003 under the supervision of Ms. Anandhi Ramachandran for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from 8th February 2016 to 30th April 2016 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.



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Name of the student: AISHA SHAMSI (MAHWISH)

Dissertation Organization: OXYENT MEDICAL PRIVATE LIMITED.

Area of Dissertation: BUSINESS ANALYSIS & SALES n MARKETING

Attendance: REGULAR

Objectives achieved: HAS ACHIEVED AS PER EXPECTATIONS.

Deliverables: ACHIEVED.

Strength: GOOD COMMUNICATION SKILLS, TEAM PLAYER, GO GETTER ATTITUDE FULL WITH ENERGY & DISCIPLINED.

Suggestions for Improvement: NOT MUCH, SHE IS AN EXCELLENT CANDIDATE FOR OUR ORGANISATION.

Signature of the officer in charge/Organization Mentor (Dissertation)

Date: 17th MAY, 2016

Place: OXYENT MEDICAL PRIVATE LIMITED.

ABSTRACT

Healthcare in India is both a complex challenge and an immense opportunity. The Indian Health care industry is growing at a rapid pace (CAGR of 17 per cent) and is expected to become a US $280 billion industry by 2020(1).IT deployment has gained paramount importance in the Indian healthcare delivery segment. It's being implemented in various departments of the hospitals, ranging from billing and finance to administration and even patient care, thereby simplifying the operations to a great extent.

The 21st Century is the age of informatics. Today's doctor needs to be as well versed in the basics of Information Technology as he/she is in anatomy, physiology and pharmacology. The healthcare Industry has evolved rapidly in the past few years; adopting state-of-art infrastructure, robotics, information systems, IOT devices, etc. Information Technology should necessarily be an integral part of any modern healthcare system.It would be no exaggeration to state that IT has made and is making and will continue to make a significant difference in patient care. Whether it is in the field of diagnosis, investigations, treatment, documentation, retrieval of information, access to state of the art knowledge, medical instrumentation, teaching, research, etc. IT has made a major difference.

In spite of the obvious short term and long term benefits it is a matter of deep concern that the use of IT in the healthcare industry is far less than its use in banking, commerce, travel, automobile or almost any other industry. Less than 2 per cent of gross revenues are set apart for deployment of ICT, compared to 5 to 8 per cent in most other industries(2).

IT improves patient care, by enabling processes and systems to be introduced and repeatedly monitored. Standard operating procedures and audit processes can be introduced

in almost every aspect of healthcare. EHRs are real-time, patient-centered records that make information available instantly and securely to authorized users.Electronic Health Record (EHR) provides clinical charting for physicians and eliminates paper charts.

The study is aimed towards analyzing the knowledge, attitude, current practices and adoption of the practicing physicians towards use of electronic records in Medicine. The following results were obtained from the respondents; out of the 100 Physicians, 78% of the survey populations were lying in the age group of 40-59 years. 22% never heard of the hospital or clinic management system. Despite the availability of various software's in the market, 89% Physicians still today use the manual process for appointment scheduling & patient records. 78% of the Physicians were aware of the Electronic Medical Records but more than 52% were not willing to use it.

It has been found that despite of having good attitude towards the use of IT applications such as smart phones, tablets, smart watches, amongst the physicians their knowledge and adaptation of IT in clinical practice was inadequate. Understanding the physician Knowledge & current practices will influence attitude of the physicians. And understanding this attitude will affect adoption to EMR's.Once we understand the barriers in adoption, we can train & provide the development of targeted education to demonstrate the advantages and implementation of EMRs in further and improve physician perceptions of EMRs.

ACKNOWLEDGEMENTS

I would like to express my deepest appreciation to all those who provided me the opportunity to complete this report. A special gratitude to the Oxyent Medical Team, whose contribution in stimulating suggestions and encouragement, helped me to coordinate my project especially in writing this report & improved my presentation skills thanks to their comment and advices.

Furthermore I would also like to acknowledge with much appreciation the crucial role of the staff of Oxyent Medical, who gave the permission to use all required equipment and the necessary materials to complete my Project report. A Special thanks to my mentor at IIHMR, Delhi, Dr.AnandhiRamachandran, who helped me to assemble the parts and gave suggestions about the project.

I would like to thank the study participants for their contribution to this investigation. It would not have been possible to complete my research work without the physical and unquantifiable moral support of Medical staff of the various hospitals.

Last but not least, many thanks to my Chief Technical Officer, Mr. Harpreet Singh who has invested his full effort in guiding me & providing me an exposure.Finally, an honorable mention goes to my family and friends for their understanding and supporting me in completing this project.

Thank You

Dr. Aisha MahwishShamsi

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LIST OF SYMBOLS & ABBREVIATIONS

ISO: International organization for standardization

DSIR: Department of Scientific and Industrial Research

R& D: Research & Development

IOT: Internet of things

iADSS: Information And Decision Support System

iCHR: Integrated Child Health Record

EHR: Electronic Health Records

PMP: Project Management Professional

TB: Tuberculosis

PHC: Primary Health center

FAQ: Frequently asked Questions

GDP: Gross Domestic Product

HL7: Health Level 7

CHR: Clinical Health Record

PHR: Personal Health Record

SRS: Software Requirement Specifications

GUI: Graphical User Interface

CEO: Chief Executive Officer

CAGR: Compounded Annual Growth Rate

EHR: Electronic Health Record

EPR: Electronic Patient Record

EMR: Electronic Medical Record

HIS: Hospital Information System

ICT: Information & Communication Technology

PART – 1 INTERNSHIP REPORT

Introduction to Organization

Oxyentis an ISO 9001:2008 and DSIR (Department of Scientific and Industrial Research) recognized company based in Delhi, India. The company's development and R&D center is located at DLF Jasola, New Delhi. The company's framework and its components incorporating industry's best practices along with specialized domain knowledge helps in achieving goals of informatics system.

Oxyent's goal and vision was, and will always be, to provide affordable, functional software and services to various domains. The team consists of domain experts and a group of highly motivated young professionals who are dedicated enough to share the company's value system and to push it to new heights

Figure 1: Lifeline of Oxyent

Oxyent has State of art technology with focus on Analytics, IoT and Cloud Computing; with immense experience

in product and services domain with proven track record with Net Scope, iADSS and iCHR. With dedicated team of engineers with strong academic background more than 60% of team having degree of Masters and PhD in Software Engineering, Mathematics and Machine Learning; the team raises above individual skills to help customer meet last mile in translation of business requirement.

The advisory board and consultants comprise of best mind in Healthcare domain in India. They also work with partners and experts in other domain across countries in Logistics, HR and Supply Chain.

Oxyent Medical launched Integrated Child Health Record (iCHR) in November 2015 as- India's 1st Hospital linked Integrated Child Health Record – a revolutionary concept of automated vaccination record and growth monitoring, for children. iCHR is up and running currently in Fortis La Femme, Jaypee Hospital, Paras Hospital, Bhagat Chandra Hospital& Alchemist Hospital.

Area of Involvement

The Internship Period was from 8th February 2016 to 30th April 2016. During this Period, I worked as an Marketing & Sales manager for Integrated Child Health Record (iCHR).

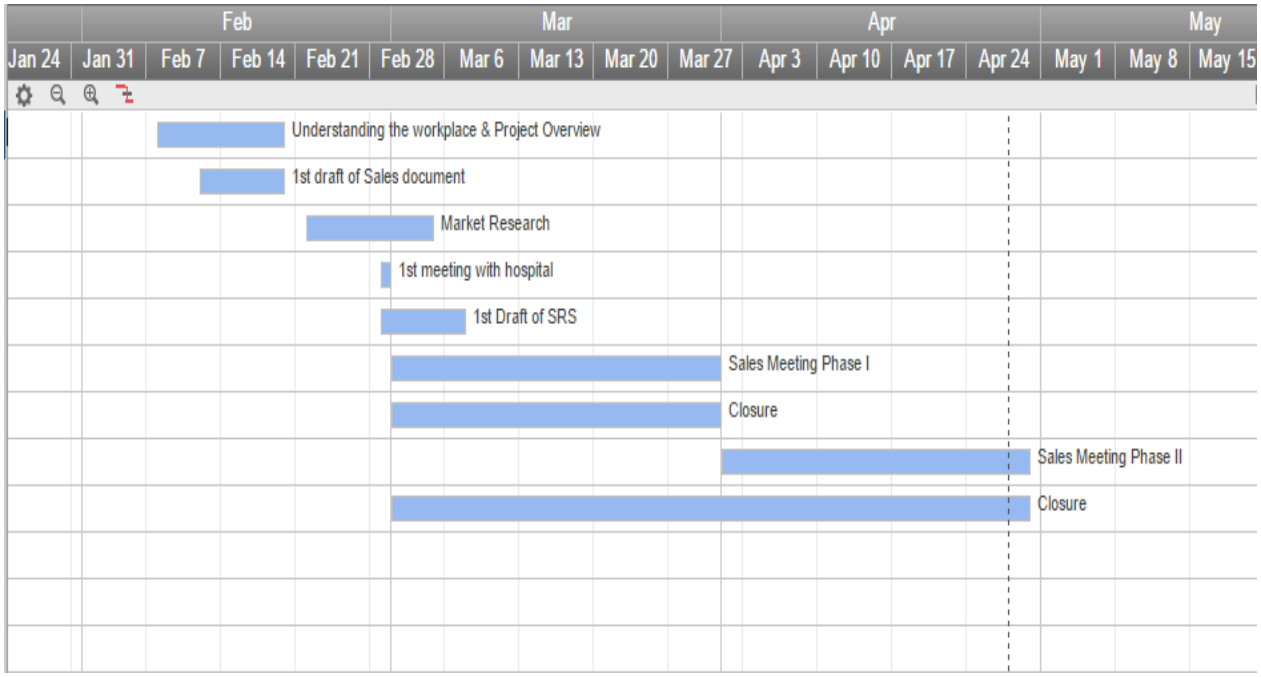


Figure 2: Gantt chart showing the tasks undertaken during the Internship Period.

Project Overview:

Integrated Child Health Record:

Protecting a child's health and ensuring proper nutrition and growth is the single most important goal of all parents. One of the most important ways of protecting a child's future is timely vaccination and every single parent always tries hard to get their child vaccinated, no matter what the circumstances are! Vaccination plays a very integral part in establishing a bond between parent/child and the doctor/hospital, not only in the first few years of life but often till adolescence. Maintaining a record of vaccinations for life is extremely important as it not only gives parents constant assurance about their child's health but is also now an important document for school admissions and for visa purposes.

Current vaccination record keeping involves written entries in books/cards, which are manually entered by the doctor and religiously carried by the parents, whenever they visit the hospital. There are numerous disadvantages of this universally practiced system, such as

- Vaccination records are not reproducible since no records are kept by the hospital.
- The sole responsibility of protecting the record lies with the parent.
- If the vaccination record is misplaced or damaged they are lost forever and there is no way to recover this valuable information.
- If the parent forgets to bring the record during the doctor's visit, very often the vaccinations cannot be administered as the doctor is unaware of the previous record.
- There is no authenticity, as anyone can make entries in the vaccination record.
- Since entries are not automated there is no mention of the brand of vaccination used, which may cause confusion to parents as well as doctors (as some brands are not interchangeable).
- Although most vaccination cards/books have growth charts, growth parameters are seldom plotted on the charts as these are time consuming or are plotted wrong due to human error.

In order to empower both parents and doctors, iCHR was introduced – a revolutionary concept of automated vaccination record and growth monitoring, for children. This project, mainly deals with successful recording and submission of each visit details including the vital parameters and the vaccination details recorded in the system by the doctor. Any

authorized user can use the application. All features and the underlying data would be controlled by a central access database.

During my Internship Period, I was involved in the requirements gathering part from the Internal as well as External Resources for the Sales of iCHR. Initially for the first week, Iwas trained about the product with documentation and demos of theiCHR software. Training was provided by the organization for coming up with Ideas & understanding the functionality of the system. Training was to understand the video and concept behind iCHR.Demo Versions of the web and mobile application of the iCHRwere studied & understood to get hold of the functionality of the system.

Followed by a training exercise to be performed on the web based software and the mobile application of iCHR.

Once the functionality & the objective of the project was understood, a structured questionnaire was drafted & requirements were gathered & validated from the Practioner at one of the hospital deployed.The Phase I consisted to target Delhi NCR, with March being Delhi & Gurgaon, April would include Noida, and May with Faridabad as the target market. A strategy plan was derived and each sales individual was assigned a set of target. Documentation of the strategy and plans was carried out. FAQ of the cost and challenges faced were also documented.

After documentation, a financial analysis of the market was done. This involved documentation of Implementation Specification for Indian Scenario. Various workflows involved according to the setup of the healthcare facility; that is; A Corporate Hospital, A Nursing Home & A Polyclinic were documented Theses workflows were designed on the

basis of my work experience & the questionnaires designed so that information could be gathered from certain doctors. During this Period the developing team was also guided regarding the Graphical User Interface (GUI) & the design of the system for implementation of iCHR.

Managerial Task within the Organization

A project plan resource wise was made and is followed till date. The tool used for project management was JIRA – Project Management Professional (PMP) & Bug tracking. This tool helps to manage the entire project well with timeline. The project plan cycle was done for the developers for adding new features to the software as well as for the sales to team for their strategy and penetration into the market. For sales it consisted of the following stages: -

- Project Initiation
- Project Planning
- Project Execution
- Project Evaluation

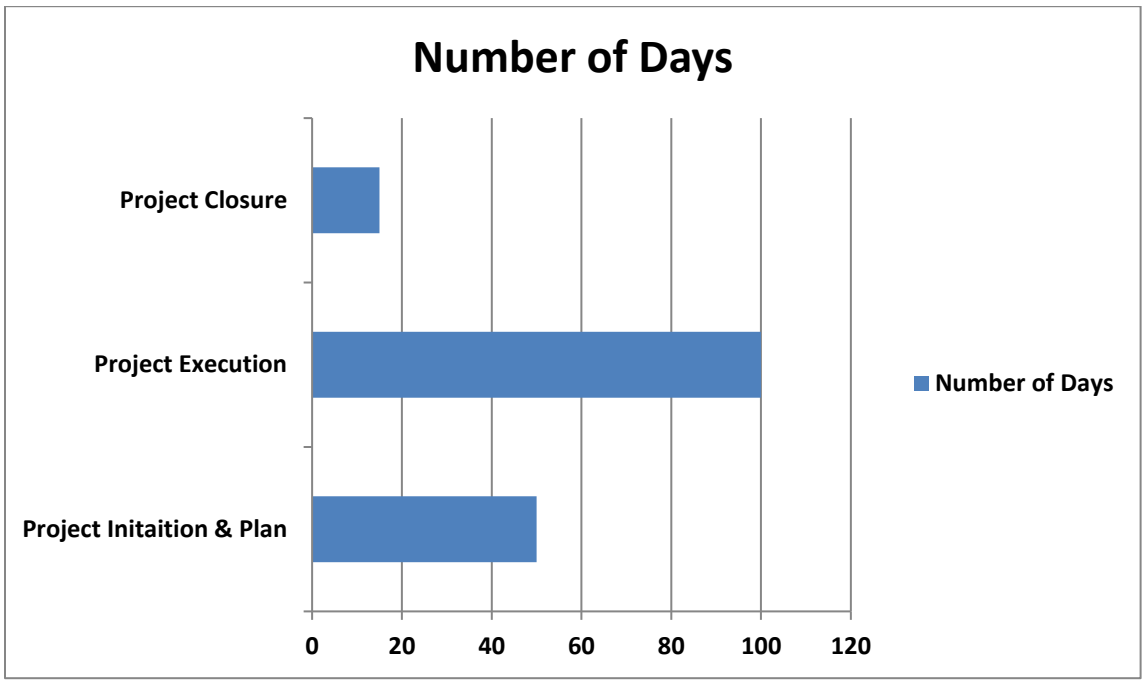


Figure 3: Start Date & Expected Number of days for completion of each phase

Project Initiation

This stage started on November 2015 and is still in progress. The following were the task done during this phase: -

- Identify and document the need/objectives that the project will address.
- Define the objective, approach and controls of the project.
- Ensure a clear and common understanding of the deliverables that will be produced.
- Clear understanding of the market penetration
- Understanding of the competitors and the advantage over them
- Specify what additions need to be completed in order to produce the deliverables.
- Determine the type of strategy followed

- Estimate how long it will take at each hospital
- Obtain appropriate management approval for effort.

Project Planning

Once the project cost was approved, effective deployment in hospitals was critical to successful resourcing and execution of the project activities. This stage included development of the overall project structure, the activities and work plan/timeline that formed the basis of the project management process throughout the project lifecycle. This Process helped in setting out the procedures that will be used within the project for tracking progress, utilizing tools and methodologies, communicating with the project team members, users and other stakeholders, and resolving issues, problems and addressing change requests.

Project Status Report

The project status report communicated the progress of the project across all the levels. The report was generated at the end of every week & also monthly. The report helped in the following ways:

- Reporting the progress of the project towards its objectives, as measured against the plan.
- Evaluating progress, weekly as well as monthly.
- Reporting issues to the authority and seek assistance through escalation, when and as necessary.

Learning from the Internship Period

The Internship Period gave me the hands-on experience with the product development life cycle in the healthcare industry and also to understand the sales prospective for a health IT product. The major learning gathered from this period are as follows:

- Market Research
- SRS Documentation
- Requirement Gathering
- Design Specifications according to the User Interface
- Creating the Project Plan & Execution
- Developing a sales strategy
- Interaction with the various clients involved

Requirement Gathering at one of the hospitals for Prescription.

A focus group discussion with a set of Pediatricians was done for integrated Child Health Record which had details on the prescription for that hospital will capture and look like.

The fields in it were:

- Patient Name
- Patient Age/Sex
- UID number
- Date
- Consultant Name
- Temperature

- Pulse Blood Pressure
- Chief complains
- Drug Allergy
- Birth History
- Milestone history
- Immunization status
- Diet History
- General & Physical Examination
- Systemic Examination
- Investigation
- Treatment
- Nutritional Advice
- To follow up on

Each field had their own details to be captured.

A discussion on what data would be captured in each field was recorded in detail along with a self-learning system would be implemented.

A graphical user interface was decided, but the doctors wanted a preset format that they were already using. It was finalized with the following fields, as it followed NABH standards.

PART – 2 DISSERTATION REPORT

Chapter – 1 Introduction

Healthcare in India

Healthcare industry is growing at a tremendous pace owing to its strengthening coverage, services and increasing expenditure by public as well private players.

• During 2008-20, the market is expected to record a CAGR of 16.5 per cent.

• The total industry size is expected to touch US$ 160 billion by 2017 and US$ 280 billion by 2020.

• As per the Ministry of Health, development of 50 technologies has been targeted in the FY16, for the treatment of disease like Cancer and TB. (3)

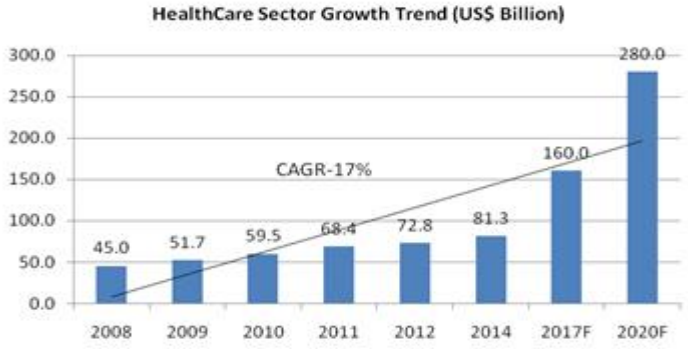


Figure 4: Healthcare in India and its trends(4)

Healthcare has become one of India's largest sectors - both in terms of revenue and employment. Healthcare comprises hospitals, medical devices, clinical trials, outsourcing,

telemedicine, medical tourism, health insurance and medical equipment. The Indian healthcare sector is growing at a brisk pace due to its strengthening coverage, services and increasing expenditure by public as well private players.

Indian healthcare delivery system is categorized into two major components - public and private. The Government, i.e. public healthcare system comprises limited secondary and tertiary care institutions in key cities and focuses on providing basic healthcare facilities in the form of primary healthcare centers (PHCs) in rural areas. The private sector provides majority of secondary, tertiary and quaternary care institutions with a major concentration in metros, tier I and tier II cities.

India's competitive advantage lies in its large pool of well-trained medical professionals. India is also cost competitive compared to its peers in Asia and Western countries. The cost of surgery in India is about one-tenth of that in the US or Western Europe(5). There is a significant scope for enhancing healthcare services considering that healthcare spending as a percentage of Gross Domestic Product (GDP) is rising. Rural India, which accounts for over 70 per cent of the population, is set to emerge as a potential demand source(6).

India requires 600,000 to 700,000 additional beds over the next five to six years, indicative of an investment opportunity of US$ 25-30 billion. Given this demand for capital, the number of transactions in the healthcare space is expected to witness an increase in near future. The average investment size by private equity funds in healthcare chains has already increased to US$ 20-30 million from US$ 5-15 million, as per PriceWaterHouseCoopers(7).

On average, one episode of hospitalization accounts for 58% of per capita annual expenditure. At the same time, increases in per capita spending, disposable income and health insurance penetration makes the health industry an attractive market opportunity to many investors.Historically, private spending within the sector has outmatched public spending by 80:20. While this allows for agile innovation and free-market competition that drives down prices, this often creates a skew towards urban care for the wealthy. Large low-income populations in rural and peri-urban areas are often neglected(8).

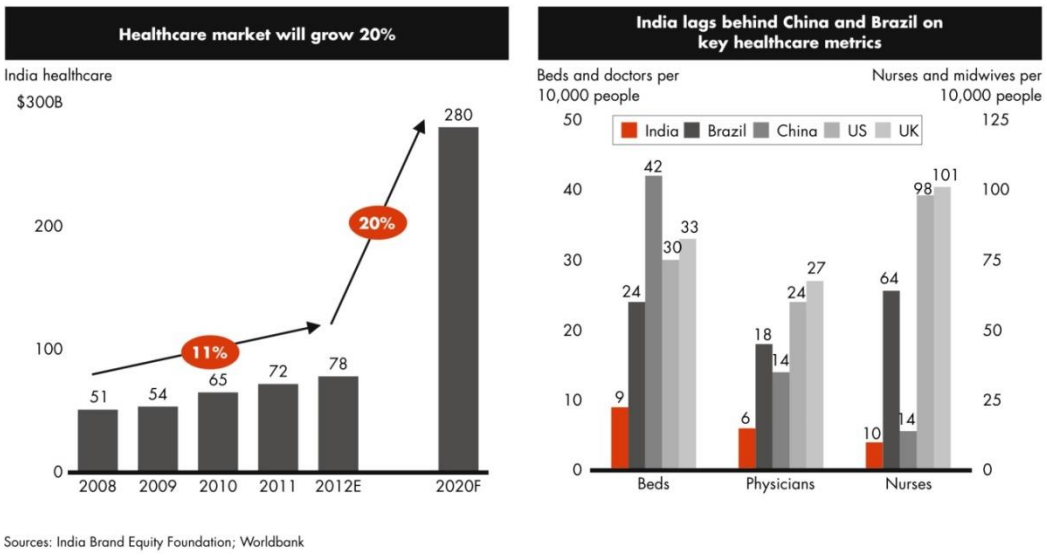


Figure 5: Healthcare in India and comparison to other countries(7)

Health IT should not be viewed as a dehumanizing process. IT should be viewed as a tool to achieve an end. Not an end by itself. IT has improved patient care in many, many ways. Providing real time appropriate relevant information to every stakeholder in the healthcare industry makes all the difference. Well informed patients and doctors can make significant differences in the standard of healthcare. Rapid increase in computing power is accompanied by exponential reduction in costs. Though the healthcare IT market in India

has grown 200—300 per cent in the last 10 years, it is accepted that the healthcare sector has to be more IT-oriented(2).

Electronic Health Record

An Electronic Health Record (EHR) is an electronic version of a patient's medical history, that is maintained by the provider over time, and may include all of the key administrative clinical data relevant to that persons care under a particular provider, including demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports (9). The EHR automates access to information and has the potential to streamline the clinician's workflow. The EHR also has the ability to support other care-related activities directly or indirectly through various interfaces, including evidence-based decision support, quality management, and outcomes reporting.

EHRs are the next step in the continued progress of healthcare that can strengthen the relationship between patients and clinicians. The data, and the timeliness and availability of it, will enable providers to make better decisions and provide better care.

For example, the EHR can improve patient care by(9):

- Reducing the incidence of medical error by improving the accuracy and clarity of medical records.
- Making the health information available, reducing duplication of tests, reducing delays in treatment, and patients well informed to take better decisions.
- Reducing medical error by improving the accuracy and clarity of medical records.

Core Functions of a EMR

A set of 8 core care delivery functions that electronic health records (EHR) systems should be capable of performing in order to promote greater safety, quality and efficiency in health care delivery.

Detailed in a new report, this list of key capabilities will be used by Health Level Seven (HL7), one of the world's leading developers of healthcare standards, to devise a common industry standard for EHR functionality that will guide the efforts of software developers.

The eight core functions are:

- health information and data,
- result management,
- order management,
- decision support,
- electronic communication and connectivity,
- patient support,
- administrative processes and reporting,
- Reporting and population health.

Features of an EMR

HL7 List of EHR Functions(10):

1. **Identify and maintain a patient record** - Identify and maintain a single patient record for each patient.

2. **Manage patient demographics** - Capture and maintain demographic information. Where appropriate, the data should be clinically relevant, reportable and trackable over time.
3. **Manage problem lists** - Create and maintain patient-specific problem lists.
4. **Manage medication lists** - Create and maintain patient-specific medication lists.
5. **Manage patient history** - Capture, review, and manage medical procedural/surgical, social and family history including the capture of pertinent positive and negative histories, patient-reported or externally available patient clinical history.
6. **Manage clinical documents and notes** - Create, addend, correct, authenticate and close, as needed, transcribed or directly-entered clinical documentation and notes.
7. **Capture external clinical documents** - Incorporate clinical documentation from external sources.
8. **Present care plans, guidelines, and protocols** - Present organizational guidelines for patient care as appropriate to support order entry and clinical documentation.
9. **Manage guidelines, protocols and patient-specific care plans** - Provide administrative tools for organizations to build care plans, guidelines and protocols for use during patient care planning and care.
10. **Generate and record patient-specific instructions** - Generate and record patient-specific instructions related to pre- and post-procedural and post-discharge requirements.
11. **Place patient care orders** - Capture and track orders based on input from specific care providers.

12. Order diagnostic tests - Submit diagnostic test orders based on input from specific care providers.
13. **Manage order sets** - Provide order sets based on provider input or system prompt.
14. **Manage results** - Route, manage and present current and historical test results to appropriate clinical personnel for review, with the ability to filter and compare results.
15. **Manage consents and authorizations** - Create, maintain, and verify patient treatment decisions in the form of consents and authorizations when required.
16. **Support for standard assessments** - Offer prompts to support the adherence to care plans, guidelines, and protocols at the point of information capture.
17. **Support for standard care plans, guidelines, protocols** - Support the use of appropriate standard care plans, guidelines and/or protocols for the management of specific conditions.
18. **Support for drug interaction checking** - Identify drug interaction warnings at the point of medication ordering.
19. **Patient specific dosing and warnings** - Identify and present appropriate dose recommendations based on patient-specific conditions and characteristics at the time of medication ordering.
20. **Support for accurate specimen collection** - Alert providers in real-time to ensure specimen collection is supported.
21. **Present alerts for preventive services and wellness** - At the point of clinical decision making, identify patient specific suggestions/reminders, screening

tests/exams, and other preventive services in support of routine preventive and wellness patient care standards.

22. **Present alerts for preventive services and wellness -** At the point of clinical decision making, identify patient specific suggestions/reminders, screening tests/exams, and other preventive services in support of routine preventive and wellness patient care standards.
23. **Notifications and reminders for preventive services and wellness -** Between healthcare encounters, notify the patient and/or appropriate provider of those preventive services, tests, or behavioral actions that are due or overdue.
24. **Support for monitoring response to notifications regarding an individual patient's health, including appropriate follow-up notifications -** In the event of a health risk alert and subsequent notification related to a specific patient, monitor if expected actions have been taken, and execute follow-up notification if they have not.
25. **Clinical task assignment and routing -** Assignment, delegation and/or transmission of tasks to the appropriate parties.
26. **Clinical task linking -** Linkage of tasks to patients and/or a relevant part of the electronic health record.
27. **Clinical task tracking -** Track tasks to guarantee that each task is carried out and completed appropriately.
28. **Clinical task timeliness tracking -** Track and/or report on timeliness of task completion.

29. **Inter-provider communication -** Support secure electronic communication (inbound and outbound) between providers to trigger or respond to pertinent actions in the care process (including referral), document non-electronic communication (such as phone calls, correspondence or other encounters) and generate paper message artifacts where appropriate.
30. **Pharmacy communication -** Provide features to enable secure bidirectional communication of information electronically between practitioners and pharmacies or between practitioner and intended recipient of pharmacy orders.
31. **Provider and patient or family communication -** Trigger or respond to electronic communication (inbound and outbound) between providers and patients or patient representatives with pertinent actions in the care process.
32. **Patient, family and care giver education -** Identify and make available electronically or in print any educational or support resources for patients, families, and caregivers that are most pertinent for a given health concern, condition, or diagnosis and which are appropriate for the person(s).
33. **Entity Authentication -** Authenticate EHR-S users and/or entities before allowing access to an EHR-S.
34. **Entity Authorization -** Manage the sets of access-control permissions granted to entities that use an EHR-S (EHR-S Users). Enable EHR-S security administrators to grant authorizations to users, for roles, and within contexts. A combination of the authorization levels may be applied to control access to EHR-S functions or data within an EHR-S, including at the application or the operating system level.
35. **Secure Data Exchange -** Secure all modes of EHR data exchange.

36. **Enforcement of Confidentiality -** Enforce the applicable jurisdiction's patient privacy rules as they apply to various parts of an EHR-S through the implementation of security mechanisms.
37. **Data Retention, Availability and Destruction -** Retain, ensure availability, and destroy health record information according to organizational standards. This includes: > Retaining all EHR-S data and clinical documents for the time period designated by policy or legal requirement; >Retaining inbound documents as originally received (unaltered); >Ensuring availability of information for the legally prescribed period of time; and >Providing the ability to destroy EHR data/records in a systematic way according to policy and after the legally prescribed retention period.
38. **Workflow Management -** Support workflow management functions including both the management and set up of work queues, personnel, and system interfaces as well as the implementation functions that use workflow-related business rules to direct the flow of work assignments.
39. **Provider demographics -** Provide a current directory of practitioners that, in addition to demographic information, contains data needed to determine levels of access required by the EHR security system.
40. **Patient demographics -** Support interactions with other systems, applications, and modules to enable the maintenance of updated demographic information in accordance with realm-specific recordkeeping requirements.
41. **Patient's residence for the provision and administration of services -** Provide the patient's residence information solely for purposes related to the provision and

administration of services to the patient, patient transport, and as required for public health reporting.

42. **De-identified data request management -** Provide patient data in a manner that meets local requirements for de-identification.
43. **Scheduling -** Support interactions with other systems, applications, and modules to provide the necessary data to a scheduling system for optimal efficiency in the scheduling of patient care, for either the patient or a resource/device.
44. **Report generation -** Provide report generation features for the generation of standard and ad hoc reports.
45. **Health record output -** Allow users to define the records and/or reports that are considered the formal health record for disclosure purposes, and provide a mechanism for both chronological and specified record element output.
46. **Specialized views -** Present specialized views based on the encounter-specific values, clinical protocols and business rules.
47. **Rules-driven clinical coding assistance -** Make available all pertinent patient information needed to support coding of diagnoses, procedures and outcomes.
48. **Rules-driven financial and administrative coding assistance -** Provide financial and administrative coding assistance based on the structured data and unstructured text available in the encounter documentation.
49. **Service authorizations -** Support interactions with other systems, applications, and modules to enable the creation of requests, responses and appeals related to service authorization, including prior authorizations, referrals, and pre-certification.

50. **Support of service requests and claims -** Support interactions with other systems, applications, and modules to support the creation of health care attachments for submitting additional clinical information in support of service requests and claims.
51. **Claims and encounter reports for reimbursement -** Support interactions with other systems, applications, and modules to enable the creation of claims and encounter reports for reimbursement.
52. **Manage Practitioner/Patient relationships -** Identify relationships among providers treating a single patient, and provide the ability to manage patient lists assigned to a particular provider.

Benefits of an EMR

EHRs and the ability to exchange health information electronically can help you provide higher quality and safer care for patients while creating tangible enhancements for your organization. EHRs help providers better manage care for patients and provide better health care by(11):

- Providing accurate, up-to-date, and complete information about patients at the point of care
- Enabling quick access to patient records for more coordinated, efficient care
- Securely sharing electronic information with patients and other clinicians
- Helping providers more effectively diagnose patients, reduce medical errors, and provide safer care
- Improving patient and provider interaction and communication, as well as health care convenience

- Enabling safer, more reliable prescribing
- Helping promote legible, complete documentation and accurate, streamlined coding and billing
- Enhancing privacy and security of patient data
- Helping providers improve productivity and work-life balance
- Enabling providers to improve efficiency and meet their business goals
- Reducing costs through decreased paperwork, improved safety, reduced duplication of testing, and improved health.

Problem Statement

The growth of a nation is not just about tallying its industrial, agricultural and services balance sheets. It is equally about tallying its performance on the human development indices. The state of its healthcare is one of the critical measures of how a nation state is performing. For a country the size of India, that is even more important. The healthcare ecosystem in India is at an inflection point. While the outlook for the healthcare industry is optimistic, there is a need to move towards an integrated healthcare delivery system, which leverages technology and has the patient at its center.

Paper-based records have been in existence for centuries and their gradual replacement by computer-based records has been slowly undertaken. Information Technology has not achieved the same degree of penetration in healthcare as that seen in other sectors such as Finance, Transport, Banking and the Manufacturing and Retail Sectors.

Hospitals have noted that ease of integration with existing solutions is the main criterion they seek from electronic medical record (EMR) vendors. The main challenge during and after implementation of EMR, is the time spent by doctors and employees on EMR systems. This proves how important training and education are in the uptake of such systems.

Despite many benefits, pointing towards the increase in the spread of ICT in healthcare, penetration of Electronic Records is still in question. The study is important for analyzing the reasons behind the relatively low adoption rate of EMRs among physicians. The study aims to understand the knowledge and current practice of physicians towards EMR, which influences their attitude to new technology. In turn, the attitude to EMR's of physician's plays a vital role for adoption of this technology. Hence we can have a better understanding of why there is a low adoption of EMR's.

Problem Rationale

Publications indicate wide lag in adoption of Electronic Medical Record in Hospital.Electronic Medical Records are means to create legible and organized recordings and to access clinical information about individual patients. Despite of the positive effects of the EMRs usage in medical practices, the adoption rate of such systems is still low and meets resistance from physicians. The EHRs represent an essential tool for improving both in the safety and quality of health care, though physicians must actively use these systems to accrue the benefits.

Despite broad agreement on the benefits of electronic health records and other forms of health information technology, health care providers have moved so slowly to adopt these technologies. Lack of readiness causes weakness of organization to undergo transformation during the implementation of the EHRs. The slow rate of adoption suggests that resistance among physicians must be strong because physicians are the main frontline user-group of EMRs. Whether or not they support and use EMRs will have a great influence on other user groups in a medical practice, such as nurses and administrative staff. As a result, physicians have a great impact on the overall adoption level of EMRs.

The aim of this study was, to identify the knowledge, attitude, current practices and adoption of Electronic Health Records (EHRs) by physicians.

Review of Literature

Electronic Medical Records (EMRs) are computerized medical information systems that collect, store and display patient information. They are means to create legible and organized recordings and to access clinical information about individual patients. The EMRs and Electronic Health Records (EHRs) are viewed as interchangeable synonyms in most health informatics(12).

The Institute of Medicine and others have suggested that the wide-scale adoption of the EHRs could be pivotal for improving patient safety and health care quality. EHRs may also reduce the costs of providing ambulatory care. However, despite emerging evidence about the benefits of EHRs, there are considerable barriers to adoption(12).

The health care sector is an area of social and economic interest in several countries; therefore, there have been lots of efforts in the use of electronic health records. Nevertheless, there is evidence suggesting that these systems have not been adopted. Physicians have a central role in the use of the EHRs, as they are who provide much of the information that the systems handle in their automated processes.

Albert Boonstra and Manda Broekhuis(2010) conducted a studyon Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. The main objective of this research was to identify, categorize, and analyze barriers perceived by physicians to the adoption of Electronic Medical Records (EMRs) in order to provide implementers with beneficial intervention options. The study includes twenty-two articles that have considered barriers to EMR as perceived by physicians. The conclusion was that there areeight main categories of barriers, including a total of 31 sub-categories. These eight categories are: A) Financial, B) Technical, C) Time, D) Psychological, E) Social, F) Legal, G) Organizational, and H) Change Process. All these categories are interrelated with each other. In particular, Categories G (Organizational) and H (Change Process) seem to be mediating factors on other barriers. The study indicates that policymakers should be more aware of the reality that removing technical, financial, and legal barriers is not sufficient to ensure the realization of the promises of EMR(13).

Robert H. Miller and Ida Sim (2004) examined the Physicians' use Of Electronic Medical Records, its barriers and solutions. They conducted nearly ninety interviews between mid-2000 and the end of 2002 with EMR managers and physician champions in thirty physician organizations that had implemented an EMR. They found that the key barriers to EMR use

from the interview data included high initial financial costs, slow and uncertain financial payoffs, and high initial physician time costs. They also found that the underlying barriers included difficulties with technology, complementary changes and support, electronic data exchange, financial incentives, and physicians' attitudes(14).

Mohamed Khalifa (2013) conducted a field study in a Saudia Arabian Hospital to identify the barriers to Health Information Systems and Electronic Medical Records Implementation. The study identified six main categories of barriers, which are consistent with those reported in recent published research. 1) Human Barriers, related to the beliefs, behaviors and attitudes, 2) Professional Barriers, related to the nature of healthcare jobs, 3) Technical Barriers, related to computers and IT, 4) Organizational Barriers, related to the hospital management, 5) Financial Barriers, related to money and funding and 6) Legal and Regulatory Barriers, related to laws, regulations and legislations. The six categories of barriers were validated with the participants of the pilot sample(15).

David W. Bates, Mark Ebell, Edward Gotlieb , John Zapp, H.C. Mullins (2003), argues that providers' and patients' information and decision support needs can be satisfied only if primary care providers use electronic medical records (EMRs). They state that barriers to adoption exist and must be overcome. The solutions recommended in the paper are implementing specific policies that can accelerate utilization of EMRs in the U.S. the initiatives and investments to lower the costs and accelerate EMR adoption as well as facilitate achievement of benefits such as common national standards for clinical data(16). Because this effort would benefit the entire population and favorably affect the large health care portion of the federal budget. They also recommend the government to facilitate

development of a public-private partnership to encourage adoption of electronic medical records in primary care.

Alex R. Kemper, Rebecca L. Uren and Sarah J. Clark(2006) researched on Adoption of Electronic Health Records in Primary Care Pediatric Practices by mail survey of 1000 randomly selected primary care pediatricians conducted from August to November 2005. They received a response of 58% and 21.3 % from these had an EHR in their practice. They concluded that Electronic health records are concentrated in larger and networked pediatric practices. Smaller and independent pediatric practices, the most common types of practice, are unlikely to adopt electronic health records until the cost of implementing and maintaining the systems decreases, developing standards for interoperability are adopted, and electronic health records are widely perceived to improve quality of care by practicing general pediatricians(17).

Despite of the potential benefits of electronic health records, implement of this technology facing with barriers and restrictions. There are several factors contributing to the resistance of EMR adoption rate. These include:

- Lack of awareness & Low computer literacy
- Absence of any government policy or initiative to promote HIT adoption.
- Technical issues – such as, functionality, ease of use.
- Cost Constraints
- Resources issues, training and re-training.
- Security, Privacy and Confidentiality issues
- Incompatibility between different systems

Many studies indicate that the more important factor than other limitations to implement the EHR is the resistance to change.Despite the positive effects from using EMRs in medical practices, the adoption rate of such systems is still low and they meet resistance from physicians.

The paper analyzes the reasons behind the relatively low adoption rate of EMRs among physicians practicing in Delhi NCR. Implementing an EMR system clearly changes the workflow in a medical practice.

Scope of the Project

The scope of the research is to study the Knowledge, Attitude, Current Practices& Adoption towards Electronic Health Records and current practices followed amongst 100 physicians of Delhi NCR, by a semi structured questionnaire by direct interviews.I conducted hundred interviews, between February 2016 to May 2016 with physicians within thirty Hospitals that had implemented an EMR.

The study is important for analyzing the reasons behind the relatively low adoption rate of EMRs among physicians. The findings of this study can be used as an overview of barriers that physicians might possibly see in the EMR implementation process and, as such, could be valuable for EMR policymakers and implementers.The scope is to understand the knowledge & current practices of Physicians. These practices influence the attitude & barriers to adoption of EMR. The study also suggests interventions that could be helpful to implementers in overcoming these barriers.

General Objective: To study the Knowledge, Attitude, Current Practices & Adoption towards Electronic Health Records amongst Physicians

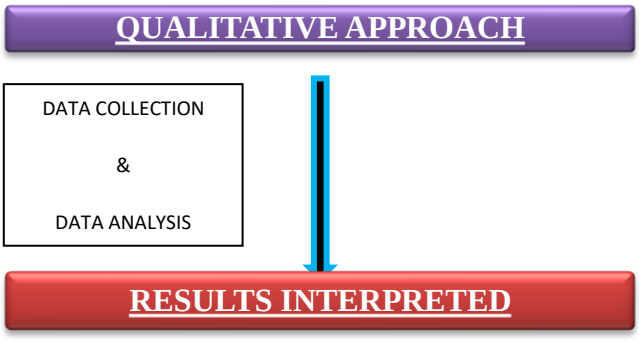
Specific Objective:

- To study the Knowledge of Electronic Health records amongst Practicing Physicians.
- To study the Attitude of Electronic Health records amongst Practicing Physicians.
- To study the Current Practices towards Electronic Health Records amongst Practicing Physicians.
- To study the Adoption of Electronic Health Records amongst Practicing Physicians.

Project Management Plan

Research Design

The study is Qualitative by nature. The study employed primary data gathering through direct interviews of physicians. The research is derived from interviews conducted using questionnaires & focuses on the interpretation of the participants.



Sample Design

- Sample Unit: Practicing Physicians from Delhi, NCR region.
- Sample Size: **100** Physicians from **30 hospitals.**
- Sampling Technique: Convenience Sampling
- Sampling Area: Delhi, NCR hospitals(>50 bedded)

Data Collection Method

- Data Type : Primary data collection
- Data Collection Tool: Semi structured questionnaire through direct interviews

Data Analysis

Qualitative Data analysis was done using Excel. Data gathering was done initially by conducting hundred interviews between February 2016 and May 2016 physician in thirty Hospitals that had implemented an EMR. From the analyzed interviews, I identified persistent and important themes and patterns. Then I constructed a typology of barriers to adopting EMRs. After which collating of the excel sheets was done. Further I did the data sorting by sorting and conditional formatting.After which I filtered the data that was significant to my study and represented it on the charts for a more organized and easier to visualize the data.

Limitations of Study

- Gathering response from a large number of doctors was difficult. Therefore, small sample size was one of the limitations for this study.

- Involving Physicians from all the age group including residents would have given a clearer picture & accurate analysis.

Chapter – 3 Results & Findings

I. Basic Information

a) Age Group Distribution of the Physicians

Out of the 100 respondents, **78%**were in the age group of **40-59 years** who were interviewed

Age Group Distribution		
Ages	Frequency	Percent
30-39 Years	22	22.0
40-49 Years	55	55
50-59 Years	23	23
Total	100	100

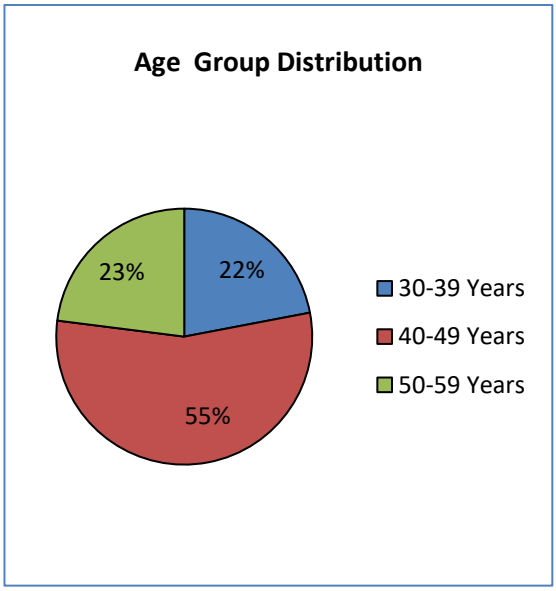


Table 1: Age Group Distribution

b) Gender Distribution of the Physicians

Out of 100 respondents, **60 were males**&**40 were females** who answered the questionnaire.

Gender Distribution			
	Gender	Frequency	Percent
	Male	60	60
	Female	40	40
	Total	100	100

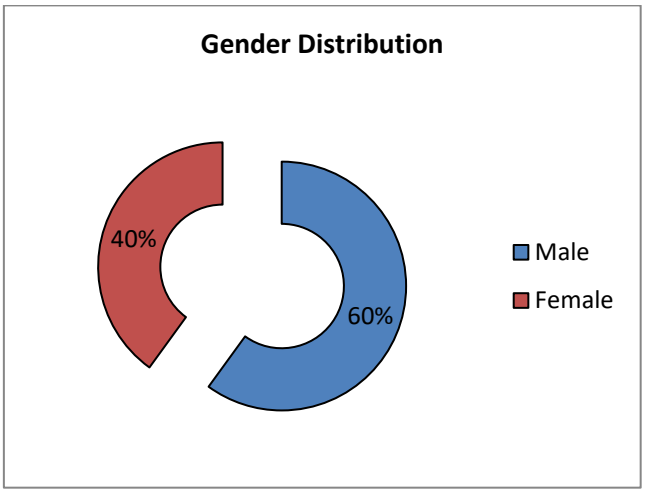


Table2: Gender Distribution

c) Clinical Experience Distribution

Out of the 100 respondents of the questionnaire, 44% had experience of more than 3 years.

A percentile of 32 % had an experience of more than 5 years.

Clinical Experience		
	Frequency	Percent
1 Year	3	2
2 -3 Years	7	8
3 - 5 Years	12	12
5 - 7 Years	32	32

7 - 10 Years	25	25
Above 10 Years	21	21
Total	100	100

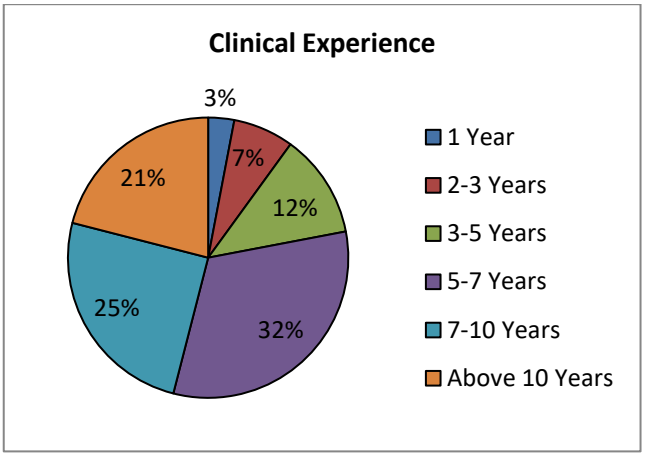


Table 3: Clinical Experience

d) Are you a physician owner of your practice

Are you a owner of your own practice			
		Frequency	Percent
Valid	Yes	72	72
	No	28	28
	Total	100	100

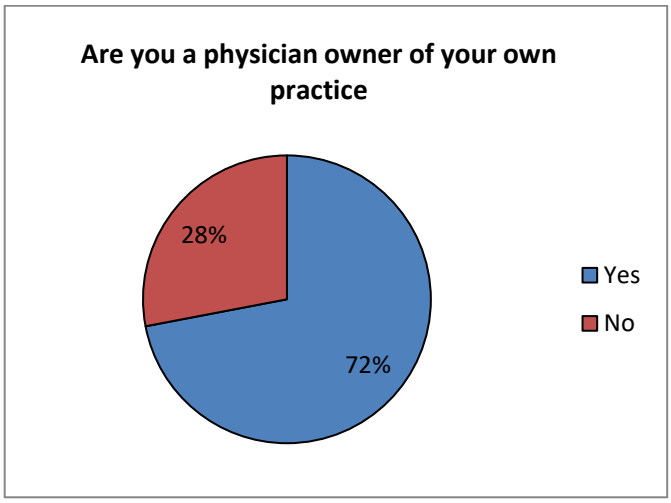


Table 4: Are you a physician owner of your practice

II. Knowledge of Physicians towards EMR

a) Have you heard about Clinic/Hospital Management Software?

Of the 100 respondents, 88 were aware of the Hospital/Clinic Management Software.

Heard of Clinic/ Hospital Management Software			
		Frequency	Percent
Valid	Yes	88	88
	No	12	12
	Total	100	100

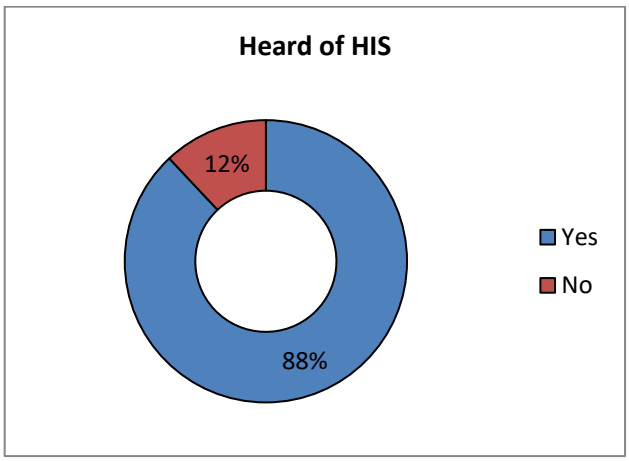


Table 5: Heard of Clinic/Hospital Management Software

b) Will EMR increase work efficiency

Only 35% Physicians agreed that EMR will help to increase work efficiency.

Will EMR increase work efficiency			
		Frequency	Percent
Valid	Yes	35	35
	No	65	65
	Total	100	100

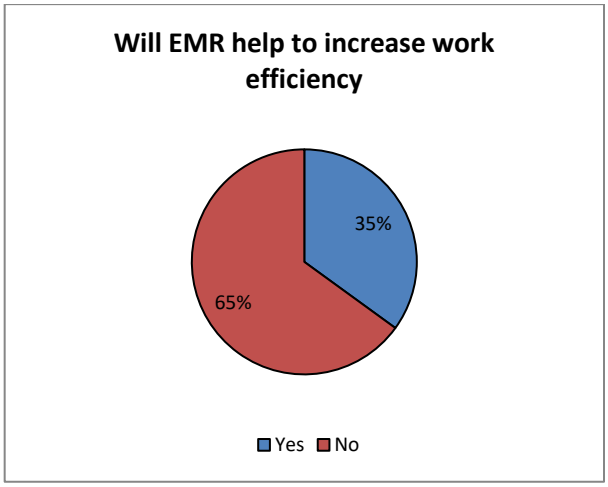


Table 6: Will EMR help gain competitive edge

c) Will EMR help to retain patients?

Will EMR Help to retain patients			
		Frequency	Percent
Valid	Yes	33	33
	No	67	67
	Total	100	100

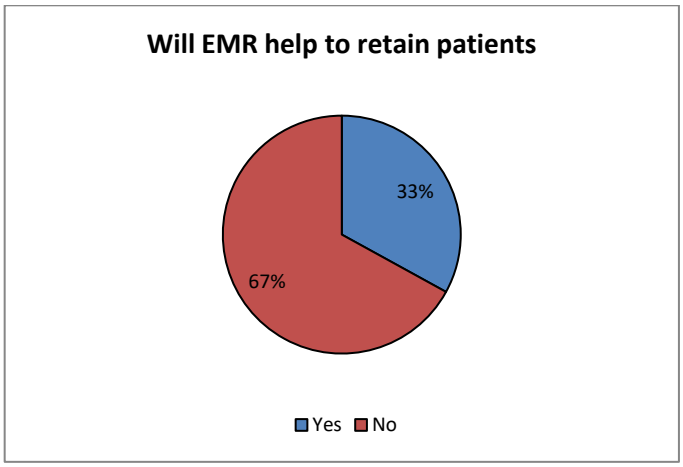


Table 7: Will EMR help to retain patient

d) Will EMR reduce medication errors?

Will EMR help to reduce medication errors			
		Frequency	Percent
Valid	Yes	33	33
	No	67	67
	Total	100	100

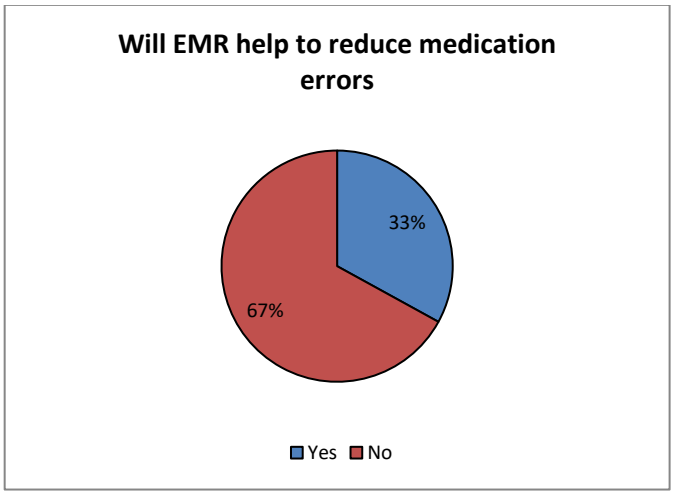


Table 8: Will EMR help to reduce medication errors

III. Attitude of Physicians towards EMR

a) How much experience to you have with EMR?

How much experience do you have with EMR			
		Frequency	Percent
Valid	1	8	8
	2	17	17
	3	56	56
	4	13	13
	5	6	6
		100	100

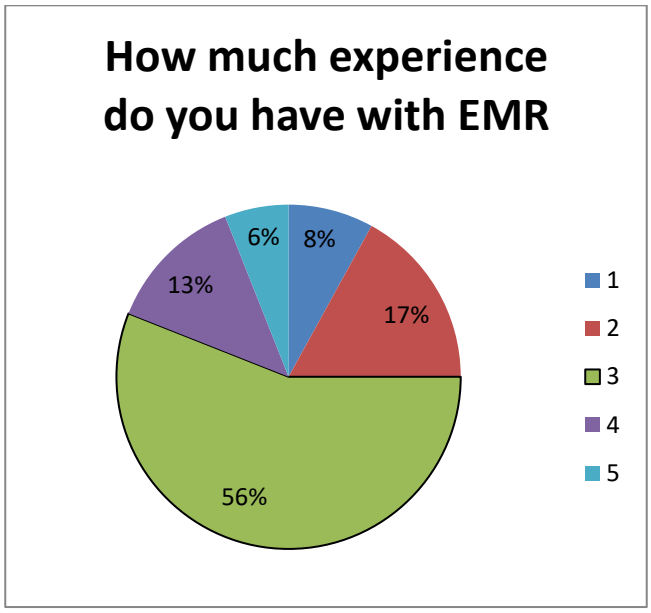


Table 9: How much experience do you have with EMR

b) How motivated are you to utilize EMR?

How motivated are you to utilize EMR			
		Frequency	Percent
Valid	1	3	3
	2	8	8

	3	48	48
	4	29	29
	5	12	12
		100	100

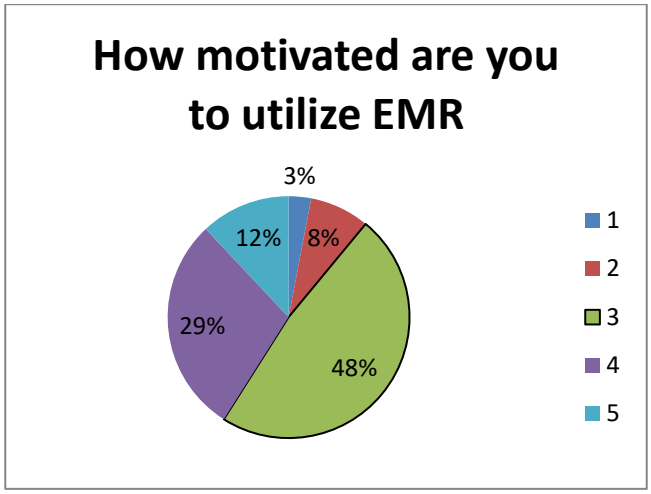


Table 10: How motivated are you to utilize EMR

c) I find it easy to use IT application in Clinical practice

I find it easy to use IT application in Clinic			
		Frequency	Percent
Valid	1	9	9
	2	23	23
	3	34	34
	4	20	20
	5	14	14
		100	100

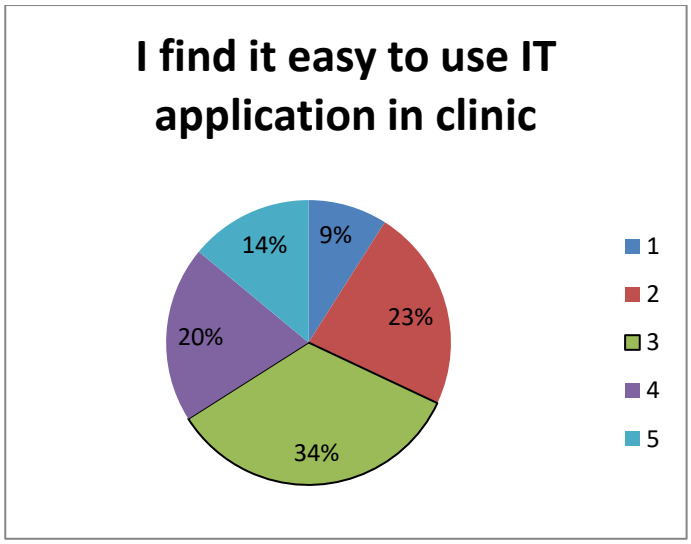
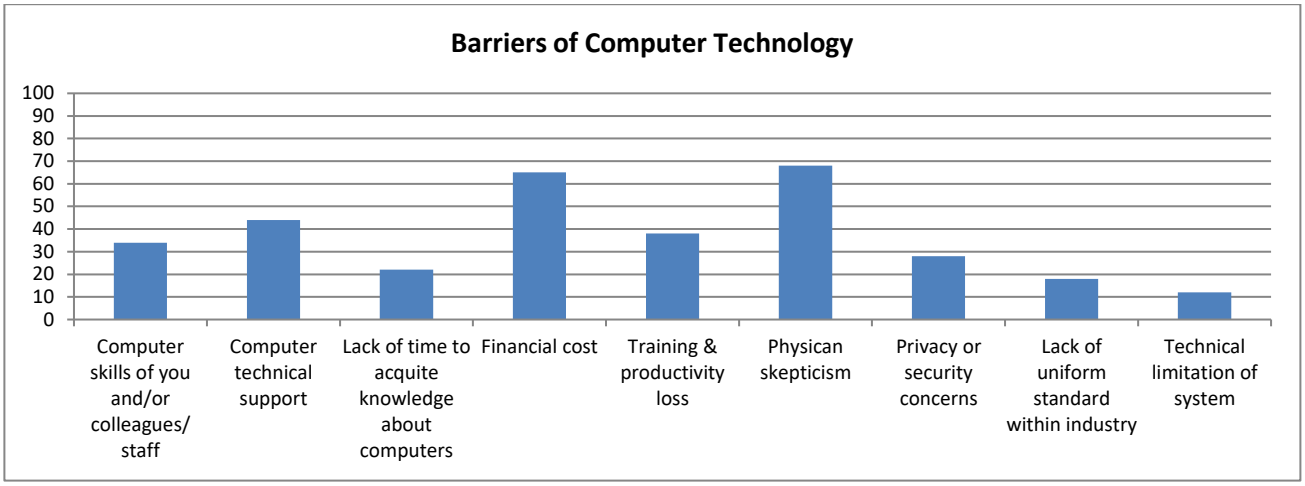


Table 11: I find it easy to use IT application in clinic

d) Barriers of Computer technology in clinic

Barriers of Computer technology in clinic			
		Frequency	Percent
Valid	Computer skills of you and/or colleagues/staff	34	34
	Computer technical support	44	44
	Lack of time to acquire knowledge about systems	22	22
	financial costs	65	65
	Training and productivity loss	38	38
	Physician skepticism	68	68
	Privacy or security concerns	28	28
	Lack of uniform standard within industry	18	18
	Technical Limitation of systems	12	12

Table 12: Barriers of computer technology



IV. Current Practice of Physician towards EMR

a) Do you use computer in your professional life?

Out of 100 respondents, **48%** used it least, and only **5%** use it most.

Do you use computer in your Professional Life?			
		Frequency	Percent
Valid	1 (Least)	48	48
	2(Sometimes)	26	26
	3	19	19
	4	5	5
	5	2	2
		100	100

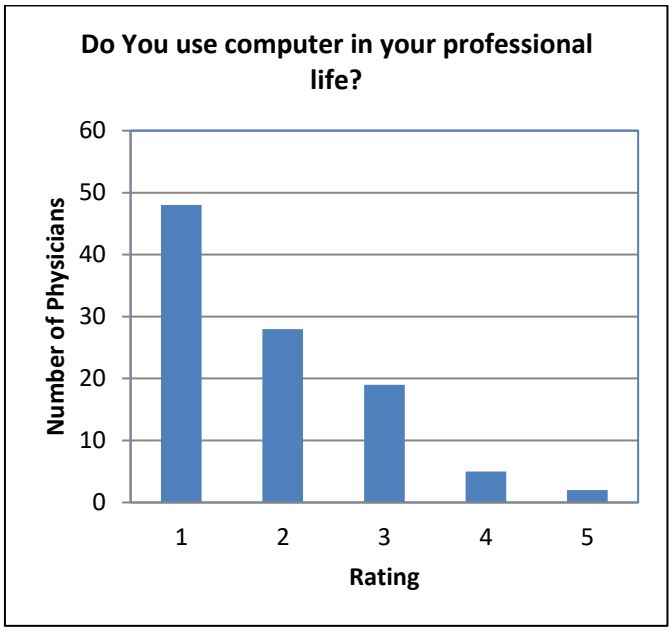


Table 13: Use computer in professional life

b) Ease of use of computers

38% were not that comfortable and only **15%** were most comfortable with computers.

Ease of use of Computers?			
		Frequency	Percent
	1 (Least)	31	31
	2(Sometimes)	25	25
	3	22	22
	4	15	15
	5	7	7
		100	100

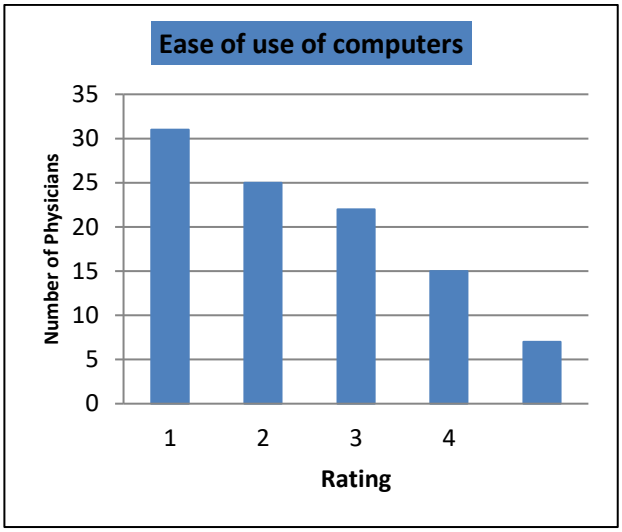


Table 14: Ease of use of computers

c) How often do you use computers

How often do you use Computers?			
		Frequency	Percent
	15min-2hours	49	49
	2-5 hours	48	48
	More than	3	3

	5 Hours		
		100	100

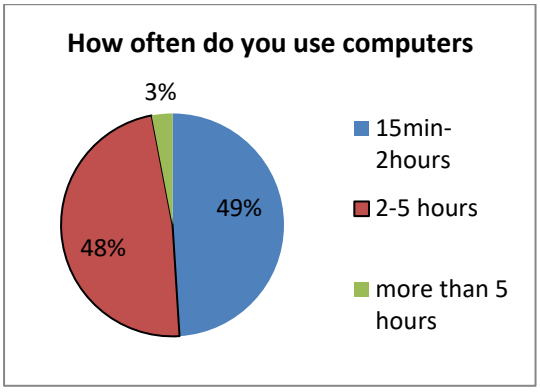


Table 15: How often do you use computers?

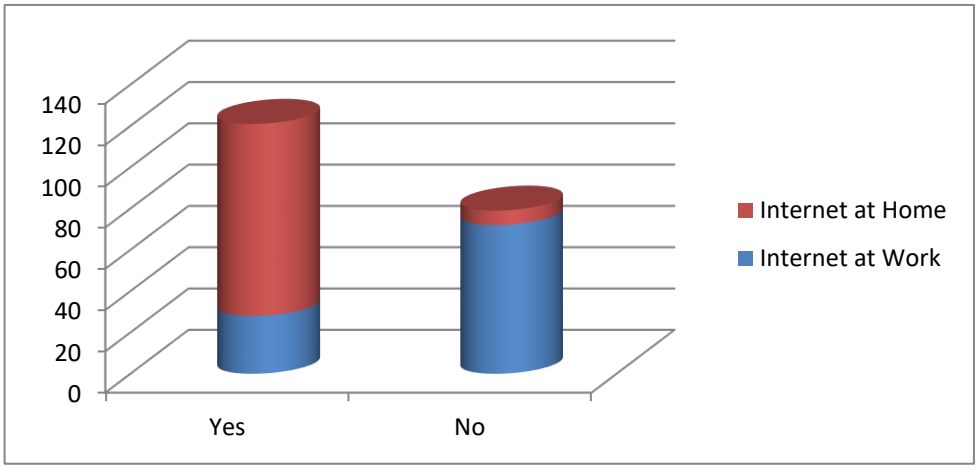
d) Do you have internet Access at work and Home?

Internet Access at Work			
		Frequency	Percent
Valid	Yes	28	28
	No	72	72
	Total	100	100

Table 16: Internet Access at Work

Internet Access at home			
		Frequency	Percent
Valid	Yes	93	93
	No	7	7
	Total	100	100

Table 17: Internet Access at home



e) Any IT applications in Clinical Practice?

55%Physicians do not use any kind of IT applications in their Clinical Practice.

Have IT applications in Clinic			
		Frequency	Percent
Valid	Yes	45	45
	No	55	55
	Total	100	100

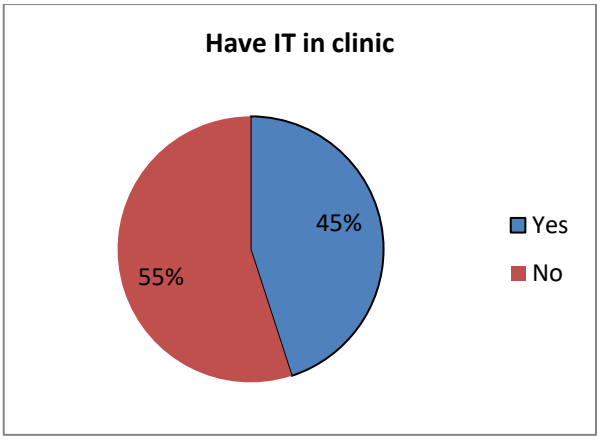


Table 18: Have IT application in clinic

f) Is Appointment Scheduling done manually?

89% of the respondents still follow manual practices for scheduling & appointment despite of various appointment applications in the market.

Is appointment scheduling done manually			
		Frequency	Percent
	Yes	89	89
	No	11	11
	Total	100	100.0

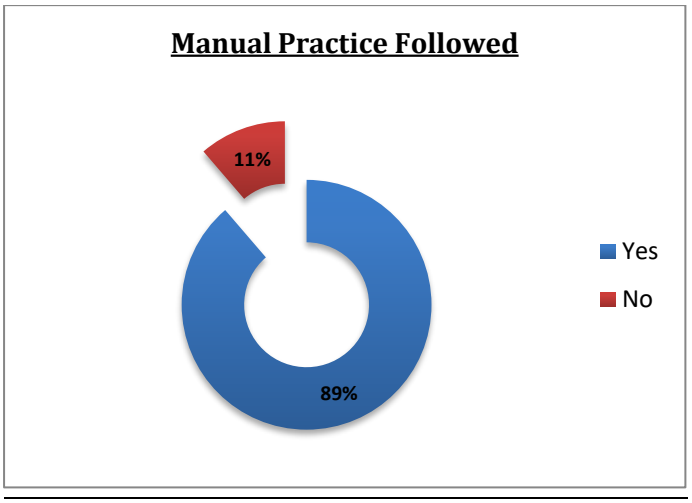


Table 19: Appointments & scheduling done manually

V. Adoption of Physicians for EMR

a) I am willing to adopt IT practices in hospital/clinic

I am willing to adopt IT practices in hospital/clinic			
		Frequency	Percent
	1 (Least)	6	6
	2(Sometimes)	8	8
	3	26	26
	4	45	45
	5	15	15
		100	100

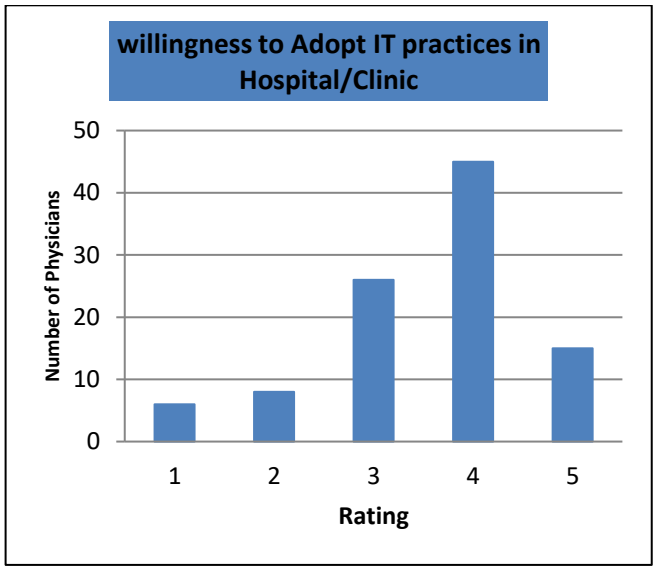


Table 20: willing to adopt IT in hospital/ clinic

a) I use healthcare apps on my phone

I use healthcare apps on my phone			
		Frequency	Percent
	1 (Least)	17	17
	2(Sometimes)	43	43
	3	25	25
	4	13	13
	5	2	2
		100	100

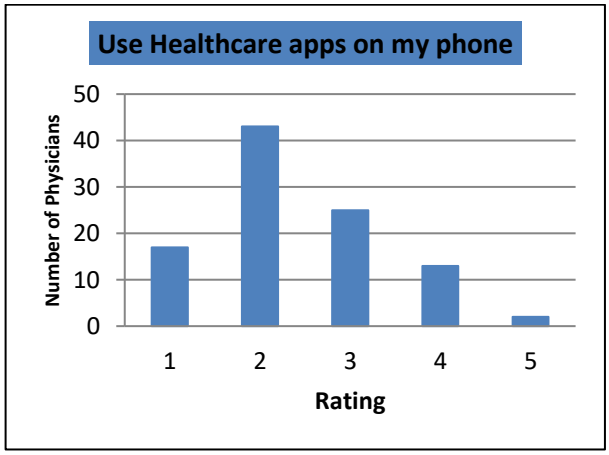


Table 21: Use healthcare apps on phone

b) I like to use the Internet to research health updates & developments.

I like to use the internet to research health updates and developments			
		Frequency	Percent
	1 (Least)	7	7
	2(Sometimes)	23	23
	3	27	27
	4	38	38
	5	5	5
		100	100

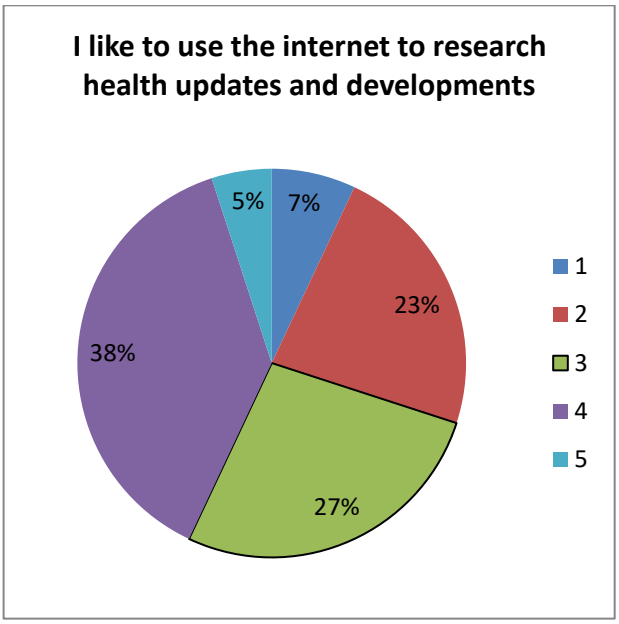


Table 22: Use internet to research health updates and developments

c) Preferred Device for using EMR

Preferred Device for using EMR			
		Frequency	Percent
Valid	Handheld Device	11	11

	Touch Tablet	28	28
	Desktop	61	61
	Total	100	100

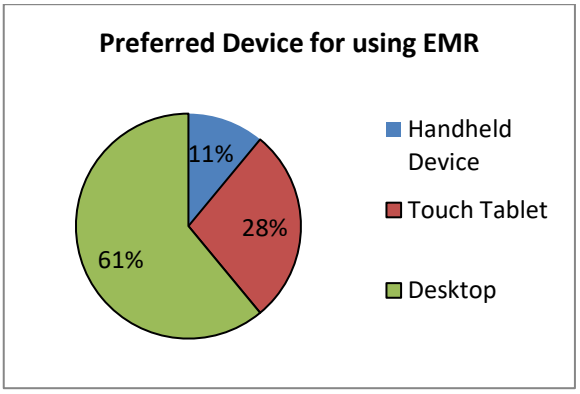


Table 23: Preferred device for using EMR

a) Should IT application be a part of Course Curriculum?

When asked whether IT applications in clinical practice should be included in the course curriculum, almost **78%** of the physicians agreed.

IT application in clinical practice has to be a part of course curriculum			
		Frequency	Percent
Valid	Disagree	10	10
	Neutral	12	12
	Agree	48	48
	Strongly Agree	30	30
	Total	100	100.0

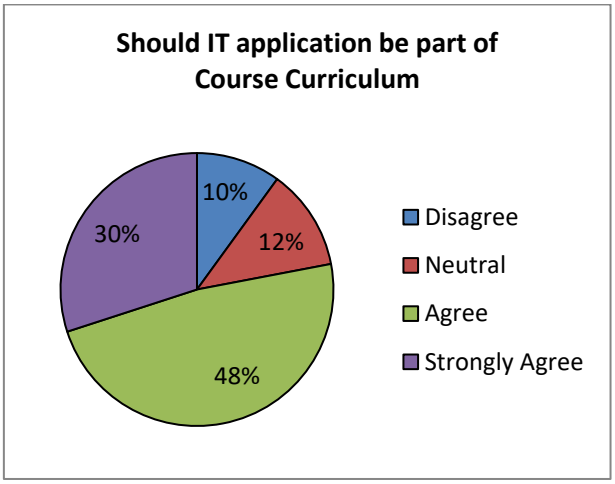


Table 24: Use computer in professional life

Chapter – 4 Discussion

The result of the current study demonstrated that, out of the 100 physicians, 78% of the survey populations were in the age group of 40-59 years. Although 88% of Physicians have heard of a Hospital/ clinic management system, 89% Physicians still today use the manual process for appointment scheduling & patient records. The main barrier of a Hospital Information system was:

a) Physicians skepticism 68%, and

b) Financial cost was suggested by 65%.

The knowledge, attitude & the behavior of the individuals were designed on the 5. Likertscale as 1-5 with strongly agree& strongly disagree, the two end points. The study shows that 76% least or sometimes use computers in their professional life.28% of physicians have access to internet at work and 93% of physicians have internet at home. 55% Physicians do not use any kind of IT applications in their Clinical Practice. Also 75% physicians agreed IT should be a part of curriculum.

This study also shows that despite of internet at home, and with 48% physicians using a computer for 2-5hours, doctors did not keep electronic records in their clinic.

Despite the positive effects from using EMRs in medical practices, the adoption rate of such systems is still low and they meet resistance from physicians. The data demonstrate the many different beliefs that physicians have about implementation EMRs. The barriers:

a) Computer skills of you and/or colleagues/staff

b) Computer technical support

c) Lack of time to acquire knowledge about systems

d) Financial costs

e) Training and productivity loss

g) Physician skepticism

h) Privacy or security concerns

i) Lack of uniform standards within industry (e.g., having to use multiple systems used by different providers and plans)

j) Technical limitations of systems

Given the multifaceted nature of the barriers, a range of policy interventions is needed to spur successful EMR-driven quality improvement. The success of health information technology (IT) depends a great deal on individual-level responses of clinician end users; those responses include acceptance/rejection of the IT and how (even whether) clinicians use the IT.

A correlation can be seen that more than 70% have limited knowledge of the benefits of EMR. The main barriers to EHR was that most physicians thought of it as a financial burden and 68% attitude toward it adoption is physician skepticism . Maximum of these physician have an internet access at home, but at work they was only 28% with internet. Although 45% have an IT application at their clinic but only 89% still do appointment scheduling manually. Also 91% still give manual prescription with more than 45% having

an IT software in the clinic. Although softwares may be present, the adoption to them is still slow.

The lack of outcome evidence might be partly explicable by the fact that this technology is still in its infancy in terms of what it will one day be capable of. Currently, most EMRs are only used as data holding and billing devices, with little attention to using them for deeper analysis of the data. There is no simple solution to accelerating EMR adoption and use for quality improvement. Given the multifaceted nature of the barriers, a range of policy interventions is needed to spur successful EMR-driven quality improvement. The success of health information technology (IT) depends a great deal on individual-level responses of clinician end users; those responses include acceptance/rejection of the IT and how (even whether) clinicians use the IT.

Recommendations

To achieve the above mentioned benefits, following recommendations should be taken: -

- ✓ **Medical schools to provide Formal Training**

  Training medical students to rely upon EHRs and their decision support tools can only serve to accelerate universal the EHR adoption. Introduce short refresher courses in computer applications & awareness about the IT applications used in Clinical Practice.

- ✓ **Performance Incentive & mandates**

Financial payback to practices for achieving quality improvement or mandates for IT use would also increase the adoption and use of EMRs for quality improvement. Adoption of pay-for-performance programs by public and private hospitals could have a powerful effect on accelerating EMR adoption and use.

- ✓ **Support for Complementary changes**

Healthcare administrators need to begin preparing their staff for the inevitable technology upgrades that will take place in their practices.

- ✓ **Standards and Interoperability**

A global data exchange EMR system compatible with other countries and compliant with global standards

- ✓ **Government Expectations**

a government role in mandating and creating incentives for the healthcare industry to move in the direction of nationwide EMR would is required

- ✓ **Vendor designing and customization in agreement with physicians**

Instead of designing a standard system for all, the need of the end users should be identified and the EMRs should be customized as per their needs and requirements.Instead of mandating the use of EMR, the physician's perception about EMR should be understood first. This will allow for the development of targeted education to demonstrate the advantage of EMRs and to further improve their

perception. This will lead to widespread adoption and successful implementation of EMRs.

Conclusion

Despite the positive effects of EMR usage in medical practices, the adoption rate of such systems is still low and meets resistance from physicians. The barriers and suggested interventions highlighted in this study are intended to act as a reference for implementers of Electronic Medical Records. A careful diagnosis of the specific situation is required before relevant interventions can be determined.

Electronic medical record system requires the user and attributes, support from others, and numerous organizational and environment facilitators. In addition, difficulty of using EMRs and the non-use of specific functions result from the presence of barrier. Widespread adoption and use of EHRs will not be possible unless the software can provide perceptible value to the users. The findings of this study can be used as an overview of barriers that physicians might possibly see in the EMR implementation process.

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